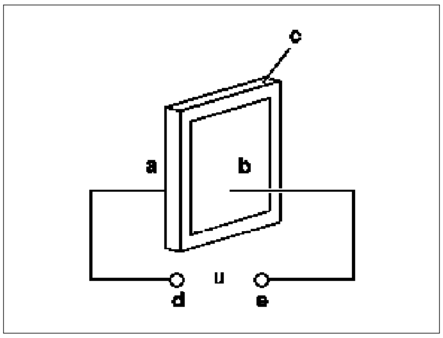
**MODEL 129, 140 as of 1.6.96,
163, 168, 170,
202 as of 1.8.96,
208,
210 as of 1.6.96,
215, 220**

Piezo-electric effect:
A thin quartz plate (c) is coated on two opposing sides with a conductive material (a), (b) (see illustration). If a tensile or compressive load is applied to the array, an electrical voltage "U" is produced between the points (d) and (e). The polarity of the generated voltage depends on the direction of load (compression/tension).



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Reversed piezo-electric effect:
If, however, a voltage is applied to the points (d) and (e), the quartz plate increases or decreases in length.

Task:
Mechanical vibrations can be converted into electrical oscillations using the piezo-electric effect. For example, for microphones, knock sensors, pressure sensors.
Electrical oscillations can be converted into mechanical vibrations or motion using the reversed piezo-electric effect: piezo-electric speakers, actuators.
Both effects are combined in the quartz resonator: If an AC voltage whose frequency is roughly equal to the mechanical resonant frequency (fundamental or harmonic component) of the quartz plate is applied to the points (d) and (e), the quartz is stimulated to generate resonant vibrations which stabilize the frequency of the electrical oscillations. For this reason, quartz resonators are often used where a high degree of frequency stability is required (e.g. in clock generators (oscillators) for electronic clocks and microprocessors).

